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ABSTRACT

Developed in Australia, the Griffith Service Access Frame (GSAF) is a model that uses the distance, size, and economic resources of a community to calculate a statistically valid score measuring a community's relative access to services. This score is then translated into Zones of Relative Access to those services. Quantifying access to services is an objective way to compare the rurality of communities. This model was used in a study of 342 communities in British Columbia (Canada) that examined community acceptance of professionals such as teachers, nurses, and social workers. The objectivity provided by the GSAF model helped to determine that community acceptance took longer in more rural communities. Given differences in data from Statistics Canada and the Australian Census Bureau, the GSAF model is more appropriate for Australia than Canada, but the basic idea of measuring access to services is a premise that holds much potential for policymakers in Canada whenever it is necessary to compare communities. (TD)

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Rurality: An Australian Quantification Model Applied in a Canadian Context

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Abstract:

In looking at funding inequities and anomalies resulting from different definitions of rurality, Australian researcher, Dr. Dennis Griffith, developed a model to quantify the access disadvantage of rural and remote populations to educational and other services. This model, the Griffith Service Access Frame, uses distance, size, and economic resources of a community to calculate a statistically valid score measuring a commuities relative access to defined services. This score is then translated into Zones of Relative Access to those services. An explanation of the Griffith model, experiences with the application of it, and the creation of Zones of Access in British Columbia will be the focus of this presentation.

An Australian Quantification Model Applied in a Canadian Context

by

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I have been examining issues faced by professionals in rural communities. In trying to make sense out of seemingly contradictory data collected in a series of interviews (Montgomery, 1998) with teachers, nurses, and social workers representing a range of rural communities throughout British Columbia, I have been isolating one variable at a time. One issue examined, for example, was that of community acceptance. To the question of how long it took before feeling that one belonged to the community, a rural social worker, with six years in that community responded:

> *I cannot say I ever felt as if I totally belonged to this community. I believe there were several communities within this community, and I felt a sense of belonging more in some of these communities than others. What do I mean? By community I am not referring to geography, rather a sense of commonality. Communities that come to mind, as I define them are: the aboriginal community, the founding families, the Newfoundland community, and the professional community. I never felt we were accepted by the founding family community. An unspoken rule was that if you had not been in this community for 2 or 3 years you were not a local. (Brett, age 32)*

A teacher, with 18 years in another rural community replied:

> *It didn't seem to take very long, a year or two maybe. I never questioned my feelings of belonging to the community or not. (Roseanne, age 38)*

A nurse who had been in her community for 24 years replied:

> *When I first came here I heard that I might be considered a local after about 20 years. Lots of people come and go, so folks get choosy about who they are going to invest their time with. It takes time to build that amount of trust, over the last few years I have been making deeper friendships, but this is a slow process. (Marcie, age 47)*

From these examples and many others there did not appear to be an explanation for the differences. Brett, Roseanne, and Marcie were all about the same age, their prior rural

experiences were fairly similar, none had received any special training to work in a rural community, and differences in their occupations did not seem to explain the diversity to their responses. However, when looking at the communities these professionals were representing, there seemed to be a pattern. Marcie represented a "high-rural" community, Brett a "medium-rural", and Roseanne a "low-rural" community. It seemed that the more rural a community was, the longer it would take to become accepted. The difficulty with this explanation, however, lies with the problem of measuring how rural a rural community is, with determining what high, medium, and low actually meant. Clearly, to get at the problem of describing acceptance into a community, another problem, quantifying rurality, had to be resolved.

In the above examples, Brett's community was the largest with a population of 4000 and was six hours away from the nearest city. Marcie's community was the smallest, with a population of 1100 and was 10 hours away from the nearest city. Roseanne's community was smaller than Brett's, with 3500 people, but was only three hours away from a city. To say that Marcie's community was the most rural made sense as she was the smallest and the most isolated, but describing Brett's and Roseanne's was not so clear. One was smaller but the other was more isolated. To further complicate the problem of comparing communities, Roseanne's community was not as well off financially. Whereas Brett's friends considered the time it took to drive to the nearest city, many of Roseanne's friends had to consider the cost. The obvious unresolved question was whether the economic differences made Roseanne's community more isolated. A model was needed that would let me somehow blend size and isolation so that I could objectively compare the rurality of a set of communities.

This paper is a description of an attempt to use a such a model. The model, invented by Australian researcher Dennis Griffith (copyright 1997), was applied (with his permission) in a Canadian context to communities in British Columbia.

The Griffith Service Access Frame (GSAF)

The GSAF model was developed in Australia (Griffith 1994) to quantify access by rural communities to educational services. The model was successfully tested (Griffith, 1997) in Tasmania, Queensland, and Australia's Northern Territory with every type of community and

location imaginable. Based on an algorithm incorporating community size, distance from a service centre, and economic ability of a community to overcome travel costs, the GSAF model created in a transparent and objective manner a statistic that enabled two communities to be compared with respect to access to a defined set of services. Population figures were from national census data, time or cost of travel figures were converted into a distance equivalence so that areas without road access could be compared to those with road access, and an Index of Economic Resources figure from the Australian Bureau of Statistics provided data regarding economic strength of a community. Weightings for each of the three variables in the algorithm (population, isolation, and economic resources) were derived using principal component analysis, a statistical data reduction technique (Hamilton, 1992) that looked for underlying dimensions accounting for a large proportion of the total variance among a set of observed variables. The end product of the statistical process was a score derived from a linear combination of the variables based on the variances within each variable and the correlations between each set of variables. Clustering communities with similar scores enabled the creation of Zones of Relative Access so that communities within a zone could be treated equitably in spite of coming from a different geographical area. In the Australian context, the creation of these zones led to a successful re-structuring of funding allocated to rural schools.

The GSAF Applied to British Columbia Communities

In applying a variation on the GSAF model to 454 communities in British Columbia, it was initially necessary to define a set of services. Since I was investigating rural professionals from the fields of education, health, and human services, it made sense to define a service center as a community with a high school, a hospital, and a social services office.

More precisely, a high school was defined as one offering Grade 12 graduation in at least the provincial core curriculum; 139 communities met this criteria. A hospital was seen as one that provided a reasonable combination of such services as general and intensive care, obstetrics, pediatrics, psychology, surgery, and intermediate or extended care; 55 communities provided such services. Social services offices were available in 81 communities. An intersection of the three sets created a list of 42 communities, the service centres for purposes of this study.

Distances from the nearest service centre for the remaining 412 communities were calculated from data provided by the Ministry of Environment, Lands & Parks (1997). In keeping with the GSAF model, a differential of 20% was applied to unpaved roads. Where travel over water was involved, time spent both travelling and waiting were computed and converted into a distance equivalent. By expressing the distance of a community from a service centre as a percentage of the provincial average distance from a service centre, a distance index score for each community was created. Marcie's community (see Table one), for example, was 410% of the provincial average distance away from the nearest service centre.

Table 1: Community Data

Community	Population	Distance	Economic	Access Score
Marcie's	93 %	410%	94%	26824
Brett's	66%	240%	43%	16251
Roseanne's	71%	154%	96%	12572

Population figures for each community were similarly treated to create an index score for the size of each community. Since it was necessary to compare small populations with large distances, the indexing was reversed. Brett's community (see Table one), a relatively large rural community, was 66% as small as the provincial average.

In calculating an economic index, the GSAF model used the Australian Bureau of Statistic's Index of Economic Resources. The closest Canadian equivalent was an Economic Dependency Ratio, which measured federal assistance received by a community. This Statistics Canada (1996) figure, derived from income tax returns, was the ratio of federal transfer payment dollars to every $100 of a community's employment income. Transfer payments to a community were calculated as the total of all unemployment insurance payments, goods and service tax credits, child tax benefits, old age security payments, Canada pension plan payments, workers compensation payments, social assistance payments, and provincial tax credits. By comparing a community's economic dependency ratio to the provincial average, it was possible to rank communities and create an index. Roseanne's community, at 96% was considerably more dependent on federal aid than Brett's which received only 43% of the

provincial average federal transfer payments.

It is worth noting that data concerning economic and population figures were only available from 357 communities. In Canada, unlike Australia, enforcement of census returns is not carried out in First Nation's communities. Nor are First Nation citizens required to submit income tax returns, so economic dependency figures are not available for every community. A confidentiality restriction imposed by Statistics Canada was that fewer than 15 similar responses to a query caused suppression of data from that community. In the eyes of Statistics Canada, 55 communities did not exist.

By treating the indices as three sets of variables, correlation coefficients of .09, .16, and .14 were generated between population, distance, and economic ability respectively. A principal component analysis of these coefficients yielded weightings of 55.6, 50.8, and 8.2. When combined linearly by multiplying the population index by 55.6, the distance index by 50.8, and the economic index by 8.2 before adding the three statistics together, an overall access to services score was generated. These weightings accounted for 73% of the total variance within the three variables

Discussion

Marcie's community, with the highest score, had the greatest difficulty accessing services. Her community was by far the smallest and the most isolated. Although her community was above the provincial average economically, the amount of isolation clearly outweighed the other two factors in contributing to such a high access score. With such a big difference in access scores, it is reasonable to objectively describe Marcie's community as being more rural than the other two communities. Marcie's community was "high-rural". Brett's community, although larger than Roseanne's, was more isolated. Even with a lower economic ability, Roseanne's community had overall greater access to services, although the difference was not as drastic as was the case between Marcie's and Brett's communities. Brett's community was "medium-rural" and Roseanne's community was "low-rural". With the objectivity of an instrument such as the GSAF model, I am now more comfortable describing acceptance into a rural community as an issue that is directly related with the rurality of a community.

It must be pointed out that the GSAF model was developed to provide an objective measure of access disadvantage. Access disadvantage is an objective way of expressing rurality or remoteness. The words rurality and remoteness are relative terms and as such mean very different things to different people. The relativity of these terms makes comparisons of rural need, population characteristics, and quality of lifestyle impossible and tends to fudge significant differences. Access disadvantage, on the other hand, measures precisely the availability of services to different geographical locations and populations and clearly shows the differences in an objective and defensible way. Griffith's ability to show these differing levels of rural/remote disadvantage demonstrated the inequity of the Australian funding allocations. By establishing Zones of Relative Access according to common access scores, homogenous but not contiguous areas were able to be classified. This allowed comparisons of populations on the basis of relative needs, such as in health or education. Establishment of the zones also allowed deeper analysis of differences between populations in the same zonal classification.

By accepting the notion that access to services is directly related to rurality, it makes sense to argue that quantifying access to services can be considered as a way to objectively compare the rurality of communities. With this caveat in mind, the graph in Figure 1 is presented to show where Marcie's, Brett's, and Roseanne's communities fit in comparison to the other 342 rural communities in British Columbia.

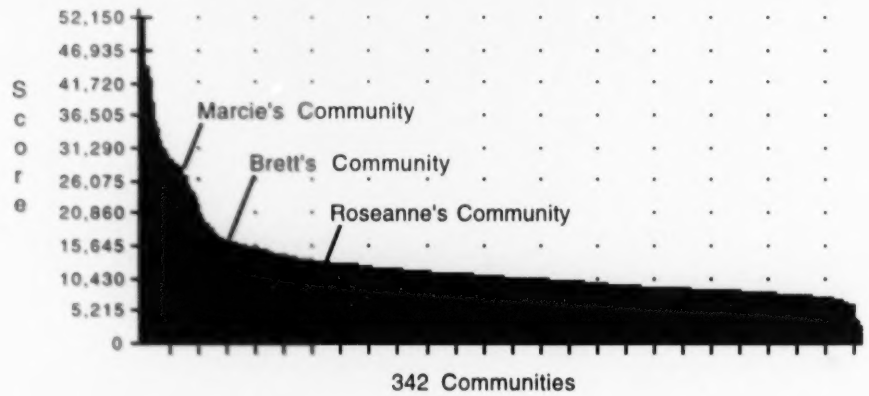

Figure 1: Access Scores of Rural Communities in British Columbia

Given the differences between data from Statistics Canada and the Australia Census Bureau, the GSAF is clearly a more appropriate model in Australia than it is in Canada. Nevertheless, the basic idea of measuring access to services is a premise that holds much potential for policy makers in British Columbia and the rest of Canada whenever it is necessary to compare communities. The GSAF model is certainly sound, but depends on data that is not fully available in Canada. Future research might well consider looking at other data collection methods to get around the deficiencies with Statistics Canada's data on very small communities.

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